5.7 Replacement and adjustment of compressor components This section is reproduced from the Compressor Service Manual Sanden SD6V12 (courtesy of Sanden International (Europe) Ltd).Figure 5.62 Fixed orifice valve remover (courtesy of Autoclimate) 34–004 Figure 5.63 Withdrawing the FOV valve (reproduced with the kind permission of Ford Motor Company Limited) 336 Automotive Air–conditioning and Climate Control Systems The tool with the number 34–004 is hooked into the housing of the fixed orifice tube.The fixed orifice tube can then be withdrawn from the line by turning the threaded sleeve.34–004 34–005 Figure 5.64 Removing the broken orifice valve (reproduced with the kind permission of Ford Motor Company Limited) 6 The environment The aim of this chapter is to:2.0 Compressor specifications SD6V12 assembly torques Item N m Armature retaining nut 19.6 1.9/ 0.9 Cylinder head bolts 14.7 0.9 Oil filler plug 14.7 4.9 Pad fitting bolt 4.9 1.9 Clutch lead wire clamp screw 1.30 0.3 High pressure relief valve 9.8 1.9 SD6V12 PAG oil The SD6V12 compressors leave the factory production line with SP10 PAG oil.Service and repair 325 Figure 5.43 Replace shims Figure 5.44 Torque armature retaining nut Figure 5.45 Check air gap with feeler gauges Automotive Air–conditioning and Climate Control Systems 4.0 Service operations – shaft seal 4.1 Replacement of lip type shaft seal Note – Lip seal assembly and felt ring must never be reused.Drain oil from the suction and discharge ports into a suitable container while turning the shaft clockwise only with a socket wrench on the armature retaining nut.Figure 5.34 Slide armature up and off shaft Figure 5.35 Remove snap ring Automotive Air–conditioning and Climate Control Systems Figure 5.36 Remove rotor Figure 5.37 Remove rotor (note – bearing staked into place) Figure 5.38 Remove clamp screw Service and repair 323 4.Sanden SP–20 refrigerant oil for R134a SD compressors Sanden provides field service containers of SP–20 PAG oil for Sanden SD–series compressors in convenient 250 cc cans.Sanden International (Europe) Ltd shall neither assume responsibility nor be kept liable for any loss or damage to the human life or body and/or the property which occurs or has occurred in conducting or in relation to services carried out in accordance with or in reference to this Service Manual.The quantity of oil in the SD6V12 compressors supplied to Opel is 120 cc.When an existing compressor is to be installed on a vehicle it is necessary to add the correct amount of compressor oil.Reverse the steps of section 3.The protrusion on the underside of the coil ring must match hole in the front housing to prevent the movement and rotation of the coil and to correctly locate the lead wire(s).Note – Clutch air gap is determined by shim thickness.When installing a clutch on a used compressor, try the original shims first.When installing a clutch on a compressor that has not had a clutch installed before, first try 1.0, 0.5 and 0.1 mm shims (Figure 5.43).Note – Clutch air gap is determined by shim thickness.When installing a clutch on a used compressor, try the original shims first.When installing a clutch on a compressor that has not had a clutch installed before, first try 1.0, 0.5 and 0.1 mm shims (Figure 5.43).Shaft seal Shaft seal removal 3111 (Continued) Figure 5.57 Removal of high pressure relief valve Figure 5.56 Oil plug removal 332 Automotive Air–conditioning and Climate Control Systems Operation Tool name Sanden tool number 5.Note – if a new compressor is installed without the excess oil being drained, the refrigerating capacity of the air–conditioning system will be reduced.Using a socket wrench on the armature retaining nut, turn the shaft clockwise until the counterweight is positioned as shown.Service and repair 333 Acceptable oil level in increments Mounting angle (degrees) SD5H14 SD7H15 0 3–5 5–7 10 4–6 6–8 20 5–7 7–9 30 6–8

8–10 40 7–9 9–11 50 8–10 10–12 60 8–10 11–13 90 8–10 16–18 Compressor repaired internally and reinstalled in the system 1.Automotive Air–conditioning and Climate Control Systems Ventilation Keep refrigerants and oils away from open flames.Hold armature assembly stationary while removing retaining nut with 14 mm socket wrench (Figure 5.33).Figure 5.33 Removal of armature retaining nut The armature can be removed by pulling it manually upwards off the splined shaft (Figure 5.34).Service and repair 327 Figure 5.49 Protector sleeve fitting Figure 5.48 Shaft seal removal Service operations – shaft seal 6.Automotive Air–conditioning and Climate Control Systems Figure 5.51 Removal of cylinder head bolts Figure 5.52 Removal of cylinder head Service and repair 329 10.Figure 5.53 Removal of valve plate Figure 5.55 (a) Tightening cylinder head bolts with a torque wrench.Service and repair 331 7.0 Service operations – replacement of high pressure relief valve (HPRV) 7.1 Remove the high pressure relief valve using a 16 mm socket or spanner (Figure 5.57).When a repaired or previously used compressor, which does not contain oil, is to be installed in the vehicle the correct oil should be added via the oil filler plug hole.If the housing of the fixed orifice tube breaks off during removal, the damaged fixed orifice tube can be removed with tool 34–005 in conjunction with the threaded sleeve of tool 34–004.Figure reader Service shall be given at risk of owner, user, operator or service personnel of the A/C system and/or the compressor for which this Service Manual is destined.Internal compressor pressure can be relieved by removing the oil plug (if necessary) or by removing shipping caps/pads from both ports.Place valve plate on cylinder block with discharge valve, retainer and nut facing up (away from cylinder block) and location pins properly located in holes.Install cylinder head bolts and tighten opposite bolts alternately to avoid distortion of cylinder head (Figure 5.55).Oil level measurement (in vehicle) Oil level in the compressor should be checked when a system component has been replaced, when an oil leak is suspected, or when it is specified as a diagnostic procedure.Sanden limits the warranty of SD compressors for field service with the condition that only Sanden–approved SP–20 is utilized.5.8 Fixed orifice valve remove and replace Tools The following tools (Figs 5.62–5.64) are available for removing and installing the fixed orifice tube: 1.Remover and installer for fixed orifice tube (with threaded sleeve) 34–004.Check for damage to pulley, incorrect center bolt torque or center bolt bottoming.System pressure release Before disconnecting any lines, always make sure that the refrigerant has been removed from the A/C system by recovering it with the appropriate equipment.When working on compressors, always be sure to relieve internal pressure first.3.0 Service operations – clutch 3.1 Armature assembly removal 1.Insert pins of armature plate spanner into holes of armature assembly.Service operations – clutch 3.2 Rotor assembly removal 1.Service operations – clutch 3.3 Field coil assembly removal 1.Remove lead wire clamp screw with Phillips screwdriver so that coil wires are free.Use a pointed tool and a small screwdriver to prevent the shims from binding on the shaft (Figure 5.40).Service operations – clutch 3.4 Field coil assembly installation 1.Ensure that the edge rests only on the inner race of the bearing, not on the seal, pulley, or outer race of the bearing.Manually push the armature down the shaft until it bottoms on the shims.Manually push the armature down the shaft until it bottoms on the shims.Engage the lips of the seal removal and installation tool with the slots in the new lip seal housing.5.0 Service operations – cylinder head 5.1 Cylinder head, valve plate removal and installation 1.It is recommended that both the head gasket (between the cylinder head and the valve

plate) and the block gasket (between the valve plate and the cylinder block) be replaced at any time the cylinder head is removed.Inspect reed valves, retainer and MFCV.(b) Tighten opposite bolts to avoid distortion Figure 5.54 Valve plate removed showing MFCV 3.Install head gasket over location pins on the cylinder block, checking for correct orientation.To replace, coat the sealing O−ring with oil and reinstall using the torque wrench.Tightening torque 14.7 4.9N m.New compressors are supplied with sufficient refrigerant oil for the air−conditioning system.Replace the oil plug as quickly as possible after draining oil and keep the A/C system sealed whenever possible to minimise moisture absorption of oil in the compressor.The quantity of oil to be added is the same as the quantity of oil, which was contained, in the removed compressor.Therefore whenever a compressor is removed from a vehicle it is important to drain out the oil and measure its quantity in a measuring cylinder.Should inadequate oil be charged to the replacement compressor, seizure is likely due to lubrication failure.Replace the oil plug as quickly as possible after draining oil and keep the A/C system sealed whenever possible to minimise moisture absorption of oil in the compressor.Determine the mounting angle of the compressor from horizontal (i.e. oil plug or adaptor on top).This is most readily done by using a machinist's universal level, if access to the compressor permits.Torque to 11−15 ft lb (15−20N m, 150−200 kgf cm).Torque to 11−15 ft lb (15−20N m, 150−200 kgf cm).Remover for damaged fixed orifice tube (without threaded sleeve) 34−005.The rotor bearing is not changeable as it is staked into position (Figure 5.37).Alternator bearing ?1.?????2.2.3.4.2.2.3.2.3.2.3.5.2.3.4.5.2.3.4.1.2.3.4.5.7.8.9.11.2.3.4.5.6.2.3.2.4.5.6.7.8.1.2.3.4.5.6.7.8.????5.2.